# Conclusion

The report has presented the mathematical foundations for fitting the diffusion tensor using diffusion-weighted MRI data. It highlighted the importance of solving an overdetermined least-squares problem, as well as the importance of managing invalid data, ensuring accurate and robust diffusion tensor estimation. Properly addressing these concerns regarding data quality ensures validity and enhances the reliability of derived diffusion metrics, reinforcing the utility of diffusion tensor imaging for both diagnostic and research applications.

We then demonstrated how SVD based feature extraction can be used in conjunction with either manual or machine learning based principal component analysis to identify indicators of disease within MRI scans. This was demonstrated through the proxy of a fully functional moustache detector which was shown to exhibit some degree of model utility. This has significant implications for the identification of neurodegenerative diseases and/or tumours within the brain where early and accurate diagnosis can have a huge impact on survivability.

# Reference

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